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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/105,739 06/26/98 BRONNER

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023123

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SCHMEISER OLSEN & WATTS
18 E UNIVERSITY DRIVE
SUITE # 101
MESA AZ 85201

EXAMINER

RAO, S

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 12/19/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/105,739	Applicant(s) BRONNER ET AL.	
	Examiner Steven H. Rao	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 26 June 1998.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 18-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claims 1-45 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> | 20) <input type="checkbox"/> Other: |

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DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-29 are, drawn to method of making an interconnect, classified in class 438, subclass 256.
- II. Claims 30-42, are drawn to an apparatus, classified in class 118, subclass 53.
- iii. Claims 43-45 are, drawn to a memory cell, classified in class 257,

subclass the inventions are distinct, each from the other because of the following reasons:

Inventions Group I (Cls. 1-29) and Group II (Cls. 30-42) are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice another and materially different process namely the dopant can be diffused from areas other than the capacitor lip.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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During a telephone conversation with Jared Pitts on a provisional election was made without traverse to prosecute the invention of Group I, claims 1-29. Affirmation of this election must be made by applicant in replying to this Office action. Claim 30-45 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings incorporating the changes listed in the enclosed PTO- 948 will be required when the application is allowed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Esch et al (U.S. Patent No. 4,240,845, herein after Esch).

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With respect to claim 1 Esch describes a method for forming interconnect between a storage capacitor(Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including :

Forming a capacitor having a lip extending over the top (fig. 3 F-I, # 49, col. 15 line 50-52) and diffusing dopant from the lip into the top surface of the substrate (Fig. 3G , col. 15 lines 53-64) .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 -29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Esch as applied to claim 1 above, and further in view of Saenger et al. (U.S. Patent No. 5,633,781, herein after Saenger cited by the applicants in their IDS).

With respect to claims 2-3 Esch describes a method for forming interconnect between a storage capacitor(Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including :

Forming a first layer(fig. 3 A # 41, col. 15 line 14) on the substrate (fig. 3A # 39, col. 15 line 13-14), etching a capacitor opening (fig. 3 E # 47, col. 15 lines 39-42) ,

Esch does not specifically disclose the formation of sidewall spacers.

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However, Saenger discloses a sidewall spacer in Fig. 1 # 18, col. 3 line 49-50 to isolate the electrode with a high dielectric constant material.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Saenger's sidewall spacers in Esch's process to isolate the electrode with a high dielectric constant material. (Saenger col. 4 line 55-65).

Etching a trench in the substrate (Esch Fig. 3 C # 44, 45 , col. 15 lines 28), removing sidewall spacer (Esch fig. 3 H) filling the trench with polysilicon capacitor fill material (Esch figs. 3 E- M , col. 15 line 42- 60).

With respect to claims 4 - 5 Esch describes a method for forming interconnect between a storage capacitor(Fig. 3F # 45, col. 15, line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including :

Recessing the capacitor fill material (Esch fig. 3 F) and filling with dielectric material (Esch fig. 3 G # 50,col. 15 line 63) and wherein the diffusing is done by annealing (Esch col. 16 line 30).

With respect to claims 6-9 Esch describes a method for forming interconnect between a storage capacitor(Esch Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including : a gate dielectric, a polysilicon gate conductor and a silicon nitride or silicon dioxide insulator (Esch Fig. 3 J, col. 16 line 26- 30) .

With respect to claims 10-11 Esch describes a method for forming interconnect between a storage capacitor(Esch Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including : claim 10

repeats the steps of claim 1-9 and further adds forming a shallow trench isolation step (well known). Claim 11 adds a patterning step (Saenger col.4 line 1).

With respect to claims 12-15 Esch describes a method for forming interconnect between a storage capacitor(Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including :

Claims 12 and 15 repeat all the steps of claims 1-11 and adds the step of source/drain implants (Esch col. 16 lines 29-35),. patterning the word line by etching (Esch fig. 4 M, col. 16 lines 46-56,) removing a portion of insulator (Esch fig. 3 H),

Claims 16 repeats the steps of claim 6, claim 17 repeats the steps of claim 1 and 11, claims 18-19 repeat the steps of claims 6 and 9. Claim 20 repeats the steps of claim 1.

With respect to claims 21 – 29 Esch describes a method for forming interconnect between a storage capacitor(Esch Fig. 3F # 45, col. 15 , line 44-45) and transfer device (metal line)(fig. 3M , metal word line) in a memory cell including :

N + doped poly silicon (well known) claim 22 repeats steps of claim 12, claim 23 repeats steps of claim 14, claim 24 repeats steps of claims 12 and 15, claim 25 repeats steps of claim 23, claim 26 repeats steps of claim 14, claim 27 repeats steps of claim 13 and 15, claim 28 repeats steps of claim 12 and 26, claim 29 repeats steps of claims 12 and 28.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is 703-306-5945. The examiner can normally be reached on M-F, 8.00 to 5.00.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703- 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703- 308-0956.

December 12, 2000


OLIK CHAUDHURI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800